IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/797,791
Applicants	:	Thomas DUERBAUM et al.
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Examiner	:	Rajnikant B. PATEL
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Title: RESONANT CONVERTER

APPEAL BRIEF

U.S. Patent and Trademark Office
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Randolph Building
401 Dulany Street
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Sir:

In response to the FINAL Office Action dated 28 December 2007, finally rejecting pending claims 5, 9, 11-13, 16-18, and 23-34, and in support of the Notice of Appeal filed on 25 March 2008, Applicants hereby respectfully submit this Appeal Brief.

REAL PARTY IN INTEREST

According to an assignment recorded at Reel 013113, Frame 0093, Koninklijke Philips Electronics N.V., owns all of the rights in the above-identified U.S. patent application.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences related to this application or to any related application, nor will the disposition of this case affect, or be affected by, any

other application directly or indirectly.

STATUS OF CLAIMS

Claims 1-4, 6-8, 10, 14-15 and 19-22 are canceled, and claims 5, 9, 11-13, 16-18, and 23-34 are pending.

Claims 5, 9, 11-13, 16-18, and 23-34 are rejected.

Accordingly, the claims on Appeal are claims 5, 9, 11-13, 16-18, and 23-34.

STATUS OF AMENDMENTS

There are no pending amendments with respect to this application.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to a resonant power converter.[1]

Accordingly, as broadly recited in claim 5, a resonant converter comprises: a transformer (FIG. 8 – element 4; page 3, line 14) with a primary winding (FIG. 8 – element 5; page 3, line 14) and at least two secondary windings (FIG. 8 – elements 6a and 6b; page 3, lines 14-15) of different winding directions (page 2, lines 1-3); a capacitive element (FIG. 8 – element 3; page 3, line 14) in series with the primary winding; at least one external inductive element (FIG. 8 – element L1; page 6, lines 8-11) in series with the capacitive element and the primary winding; an inverter (FIGs. 2 and 8 – element 2; page 3, line 13) in series with the capacitive element, the external inductive element, and the primary winding of the transformer; and multiple outputs (FIG. 8 – elements 7a, 7b; page 3, lines 21-24) coupled to the secondary windings of the transformer; wherein the resonant frequency of the resonant converter is determined by the main inductance and the leakage inductances of the transformer, the capacitive element, and the external inductive element (page 2, lines

1 In the description to follow, citations to various reference numerals, figures, and corresponding text in the specification are provided solely to comply with Patent Office rules. It should be understood that these reference numerals, figures, and text are exemplary in nature, and not in any way limiting of the true scope of the claims. It would therefore be improper to import anything into any of the claims simply on the basis of **exemplary** language that is provided here only under the obligation to satisfy Patent Office rules for maintaining an Appeal.

8-14; page 3, lines 30-34; page 5, lines 7-17; and page 6, lines 11-13).

As broadly recited in claim 9, a resonant converter comprises: multiple outputs (FIGs. 1 and 8-10 – elements 7a, 7b; page 3, lines 21-24); and a transformer (FIGs. 1 and 8-10 – element 4; page 3, line 14) with a primary winding (FIGs. 1 and 8-10 – element 5; page 3, line 14) and at least two secondary windings of different winding directions (page 2, lines 1-3), wherein different ratios of a magnitude of output voltage to number of turns are provided in respect of associated secondary windings having different winding directions (FIGs. 5-7; page 2, lines 22-24; page 5, lines 1-12).

As broadly recited in claim 31, a resonant converter, comprises: multiple outputs FIGs. 1 and 8-10 – elements 7a, 7b; page 3, lines 21-24); and a transformer (FIGs. 1 and 8-10 – element 4; page 3, line 14) with a primary winding (FIGs. 1 and 8-10 – element 5; page 3, line 14) and at least two secondary windings (FIGs. 1 and 8-10 – elements 6a and 6b; page 3, lines 14-15) of different winding directions (page 2, lines 1-3), wherein the secondary windings of the transformer are connected to the converter outputs by way of one diode (FIGs. 1 and 8-10 – elements Da and Db; page 3, lines 21-24) and one output filter each (FIGs. 1 and 8-10 – elements Fa and Fb; page 3, lines 21-24), and wherein the transformer has a first group of secondary windings (FIGs. 1 and 8-10 – elements 6a) with one or more secondary windings having a first winding direction (page 2, lines 1-2) and a second group of secondary windings (FIGs. 1 and 8-10 – elements 6b) with one or more secondary windings having a second winding direction (page 2, lines 2-3), at least two of the secondary windings being electrically separated from one another (page 2, line 4), further comprising a regulating circuit (FIGs. 1, 8-10 & 12 – element 8; page 4, lines 12-13; page 6, line 28 – page 7, line 1) for deriving from each of the multiple outputs (page 7, lines 12-14) a measuring signal for regulating an output voltage of the inverter (page 7, lines 30-31).

As further featured in claim 34, in the resonant converter of claim 5, the inverter (FIGs. 1, 2 and 8-10 – element 2) comprises: first and second switching elements (FIG. 2 – elements 24 and 25 – page 4, lines 15-16) arranged in series across an input DC voltage; and a half-bridge drive circuit (FIG. 2 – element 21; page

4, line 14) adapted to receive a signal (FIG. 2 – element 20; page 4, lines 12-13) from a regulating circuit (FIGs. 1, 8-10 & 12 – element 8; page 4, lines 12-13) and in response thereto to provide first and second control signals (FIG. 2 – elements 22 and 23; page 4, lines 14-15) for switching the first and second switching elements, respectively, wherein an output (FIG. 2 – Us; page 4, lines 17-19) of the inverter at a node between the first and second switching elements is connected in series with the capacitive element, the external inductive element, and the primary winding of the transformer.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on Appeal are: (1) the rejections of claims 9 and 16 under 35 U.S.C. § 102 over Liu et al. U.S. Patent 5,363,287 ("Liu"); (2) the rejections of claims 5 and 31 under 35 U.S.C. § 103 over Liu in view of Raets U.S. Patent 5,777,859 ("Raets"); (3) the rejections of claims 11-13, 17-18, 25-27 and 32-34 under 35 U.S.C. § 103 over Liu in view of Raets and further in view of Steigerwald et al. U.S. Patent 4,695,934 ("Steigerwald") and Marson et al. U.S. Patent 5,077,486 ("Marson"); and (4) the rejections of claims 23-24 and 28-30 under 35 U.S.C. § 103 over Liu in view of Steigerwald and Marson.

ARGUMENTS

(1) Claims 9 and 16 are Patentable over Liu

Claim 9

Among other things, in the resonant converter of claim 9 *different ratios of a magnitude of output voltage to number of turns* are provided *in respect of associated secondary windings having different winding directions*.

Applicants respectfully submit that Liu does not disclose a resonant converter including such a combination of features. In that regard, it is noted that the magnitude of -12 volts is the same as the magnitude of +12 volts.

After years of prosecution and several Office Actions, in the FINAL Office Action, the Examiner now offers this quite confusing statement:

As to the argument related to claim 9, Liu et al. disclose the both limitation the secondary winding has different direction as well as a different ratio of a magnitude of output voltage, since Liu et al. discloses claimed subject matters except the number of turn. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize same end result since examiner takes official notice of the equivalence of a different ratio of a magnitude of output voltage for their use in the applied art and selection of any of these equivalents to desire output would be within level of ordinary skill in the art.

First off, the Examiner has rejected claim 9 under 35 U.S.C. § 102. Applicants respectfully submit that what would or would not have been obvious is irrelevant to a rejection under 35 U.S.C. § 102.

Secondly, in the very same sentence, the Examiner claims that Liu **actually discloses** "*a different ratio of a magnitude of output voltage*" AND that "***it would have been obvious*** *to one having ordinary skill in the art at the time the invention was made to utilize same end result since examiner takes official notice of the equivalence of a different ratio of a magnitude of output voltage for their* (sic) *use in the applied art and selection of any of these equivalents to desire* (sic) *output would be within level of ordinary skill in the art*."

Besides being so grammatically flawed as to have its meaning be unintelligible, the sentence is self-contradictory. Also, it is entirely unclear what "*these equivalents*" are supposed to be, among other ambiguities in this sentence.

Finally, the Examiner has failed to offer any evidence at all in support of whatever Official Notice he is really attempting to take here, which is required under M.P.E.P. § 2144.03, and because the Examiner has taken this Official Notice here for the first time in this Final Office Action, Applicants are taking this very first opportunity to challenge it in this Appeal Brief and request that the Examiner supply with the Examiner's Answer evidentiary proof of whatever facts of which Official Notice are being taken by the Examiner.

Most importantly, however, stands the plain fact that Liu just does not disclose a resonant where different ratios of a magnitude of output voltage to number of turns are provided in respect of associated secondary windings having different winding directions.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 9 is patentable under 35 U.S.C. § 102 over Liu.

Claim 16

Claim 16 depends from claim 9 and is patentable over Liu for at least the reasons set forth above with respect to claim 9.

(2) Claims 5 and 31 Are Patentable Over Liu and Raets

Claim 5

Among other things, the resonant converter of claim 5 includes an inverter in series with a capacitive element, an external inductive element, and the primary winding of the transformer.

The Office Action fairly admits that Liu does not disclose such an arrangement. However, the Office Action states that Raets discloses such an arrangement, and that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Liu to include Raets' arrangement.

Applicants respectfully disagree. Applicants respectfully submit that the Examiner fails to provide a reason for changing Liu's resonant converter to include the arrangement discloses by Raets.

Indeed, Applicants respectfully submit that such a modification of Liu's device would be quite improper.

The principal object of Liu's invention is to achieve a reduction in radiated EMI (see, e.g., Abstract; col. 1, lines 8-67) On the other hand, it seems that replacing Liu's combination of gate filter 30, switching circuit 20, capacitor 26 and inductor 18 with Raets' arrangement with its multiple switching devices would necessarily **increase** the radiated EMI. Thus, the proposed combination would destroy Liu's object and therefore would never have been obvious to one of ordinary skill in the art at the time the invention was made.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 5 is patentable over the cited prior art.

Claim 31

Among other things, the resonant converter of claim 31 includes a regulating circuit for deriving from each of the multiple outputs a measuring signal for regulating an output voltage of the inverter.

Applicants respectfully submit that no combination of the cited art would produce a resonant converter including such a feature.

Applicants respectfully submit that Liu and Raets do not disclose such a feature.

Furthermore, the Examiner does not allege that Liu or Raets or any combination thereof discloses such a feature.

Instead, the Examiner merely alleges that Raets' item 20 "teaches" a "*similar technique*."

Even assuming *arguendo* that this was true, the undersigned attorney is unaware of any legal standard for an obviousness rejection based upon nothing more than a mere, unexplained, "similarity."

Furthermore, Applicants respectfully submit that Raets' item 20 does not "teach" a "*similar technique*." Raets' control circuit 20 does not even receive multiple outputs of a resonant converter. So Liu in combination with Raets does not disclose or suggest a resonant converter that includes a regulating circuit for deriving from each of the multiple outputs a measuring signal for regulating an output voltage of an inverter.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 31 is patentable over the cited art.

(3) Claims 11-13, 17-18, 25-27 and 32-34 Are All Patentable Over Liu, Raets, Steigerwald and Marson

At the outset, Applicants note that claims 11-13, 17-18, 25-27 and 32-34 depend variously from claims 5 and 31. Applicants also submit that Steigerwald and Marson do not remedy the shortcomings of Liu and Raets as set forth above with

respect to claims 5 and 31. Therefore, claims 11-13, 17-18, 25-27 and 32-34 are deemed patentable over any combination of Liu, Raets, Steigerwald and Marson for at least the reasons set forth above with respect to claims 5 and 31, and for the following additional reasons.

Applicants respectfully traverse the proposed modification of references as lacking any reason or suggestion in the art to make the modification. The Examiner states that it would have been obvious to modify Liu and Raets as proposed for each of these dependent claims because "*utilizing the technique taught by Steigerwald et al. and Marson et al.*" would supposedly "*increas*[e] *the efficiency of the power, reduc*[e] *cost and increas*[e} *availability*."

However, the Examiner fails to provide any explanation or evidence whatsoever as to why this would supposedly be the case.

It is well established that a rejection under 35 U.S.C. § 103 cannot be sustained on unsupported allegations of an Examiner. M.P.E.P. § 2142 provides that:

> "*The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also KSR, 550 U.S. at ___ , 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval).*"

No such articulated reasoning or rational underpinnings have been provided here.

So the proposed combination is respectfully traversed.

Accordingly, for at least these reasons, Applicants respectfully submit that claims 11-13, 17-18, 25-27 and 32-34 are patentable over the cited art, and for the following additional reasons.

Claim 34

Among other things, the resonant converter of claim 34 includes a half-

bridge drive circuit adapted to receive a signal from a regulating circuit and in response thereto to provide first and second control signals for switching the first and second switching elements.

The Examiner fails to even mention this feature, and therefore has failed even to establish a case of *prima facie* obviousness under 35 U.S.C. § 103.

(4) Claims 23-24 and 28-30 Are All Patentable Over Liu, Steigerwald and Marson

At the outset, Applicants note that claims 23-24 and 28-30 all depend from claim 9. Applicants also submit that Steigerwald and Marson do not remedy the shortcomings of Liu as set forth above with respect to claim 9. Therefore, claims 23-24 and 28-30 are deemed patentable over any combination of Liu, Steigerwald and Marson for at least the reasons set forth above with respect to claim 9, and for the following additional reasons.

Applicants respectfully traverse the proposed modification of references as lacking any reason or suggestion in the art to make the modification. The Examiner states that it would have been obvious to modify Liu as proposed for each of these dependent claims because "*utilizing the technique taught by Steigerwald et al. and Marson et al.*" would supposedly "*increas*[e] *the efficiency of the power, reduc*[e] *cost and increas*[e} *availability*."

However, the Examiner fails to provide any explanation or evidence whatsoever as to why this would supposedly be the case.

It is well established that a rejection under 35 U.S.C. § 103 cannot be sustained on unsupported allegations of an Examiner. M.P.E.P. § 2142 provides that:

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No such articulated reasoning or rational underpinnings have been provided here.

So the proposed combination is respectfully traversed.

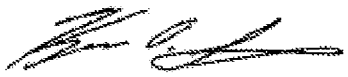
Accordingly, for at least these reasons, Applicants respectfully submit that claims 23-24 and 28-30 are patentable over the cited art .

CONCLUSION

For all of the foregoing reasons, Applicants submit that claims 5, 9, 11-13, 16-18, and 23-34 are all patentable over the cited prior art. Therefore, Applicants respectfully request that the rejections of claims 5, 9, 11-13, 16-18, and 23-34 be withdrawn, the claims be allowed, and the application be passed to issue.

Respectfully submitted,

VOLENTINE & WHITT



By: _____
Kenneth D. Springer
Registration No. 39,843

VOLENTINE & WHITT
11951 Freedom Drive, Suite 1260
Reston, Virginia 20190
Telephone No.: (571) 283-0724
Facsimile No.: (571) 283-0740

CLAIMS APPENDIX

Claims 1-4. (Canceled)

5. (Previously Presented) A resonant converter comprising:

a transformer with a primary winding and at least two secondary windings of different winding directions;

a capacitive element in series with the primary winding;

at least one external inductive element in series with the capacitive element and the primary winding;

an inverter in series with the capacitive element, the external inductive element, and the primary winding of the transformer; and

multiple outputs coupled to the secondary windings of the transformer;

wherein the resonant frequency of the resonant converter is determined by the main inductance and the leakage inductances of the transformer, the capacitive element, and the external inductive element.

Claims 6-8. (Canceled)

9. (Previously Presented) A resonant converter comprising:

multiple outputs; and

a transformer with a primary winding and at least two secondary windings of different winding directions,

wherein different ratios of a magnitude of output voltage to number of turns are provided in respect of associated secondary windings having different winding directions.

Claim 10. (Canceled)

11. (Previously Presented) The resonant converter of claim 5, further including:

means for deriving from each of the multiple outputs a measuring signal for regulating an output voltage of the inverter.

12. (Previously Presented) The resonant converter of claim 11, wherein the transformer has a first group of secondary windings with one or more secondary windings having a first winding direction and a second group of secondary windings with one or more secondary windings having a second winding direction, at least two of the secondary windings being electrically separated from one another.

13. (Previously Presented) The resonant converter of claim 5, wherein the transformer has a first group of secondary windings with one or more secondary windings having a first winding direction and a second group of secondary windings with one or more secondary windings having a second winding direction, at least two of the secondary windings being electrically separated from one another.

14-15. (Canceled)

16. (Previously Presented) The resonant converter of claim 9, wherein the transformer has a first group of secondary windings with one or more secondary windings having a first winding direction and a second group of secondary windings with one or more secondary windings having a second winding direction, at least two of the secondary windings being electrically separated from one another.

17. (Previously Presented) The resonant converter of claim 5, wherein the transformer has a first group of secondary windings with one or more secondary windings having a first winding direction and a second group of secondary windings with one or more secondary windings having a second winding direction, at least two of the secondary windings being electrically connected to one another.

18. (Previously Presented) The resonant converter of claim 17, wherein the secondary windings are connected to a ground potential.

Claims 19-22. (Canceled)

23. (Previously Presented) The resonant converter of claim 9, wherein the transformer has a first group of secondary windings with one or more secondary windings having a first winding direction and a second group of secondary windings with one or more secondary windings having a second winding direction, at least two of the secondary windings being electrically connected to one another.

24. (Previously Presented) The resonant converter of claim 23, wherein the secondary windings are connected to a ground potential.

25. (Previously Presented) The resonant converter of claim 11, wherein the transformer has a first group of secondary windings with one or more secondary windings having a first winding direction and a second group of secondary windings with one or more secondary windings having a second winding direction, at least two of the secondary windings being electrically connected to one another.

26. (Previously Presented) The resonant converter of claim 25, wherein the secondary windings are connected to a ground potential.

27. (Previously Presented) The resonant converter of claim 5, further comprising:

a regulating circuit for deriving from each of the multiple outputs a measuring signal for regulating an output voltage of the inverter,

the inverter being coupled to an output of the regulating circuit and in response thereto generating a chopped DC voltage signal to be coupled to the primary winding of the transformer,

wherein the regulating circuit provides a signal to the inverter to set a frequency and a duty cycle of the chopped DC voltage signal.

28. (Previously Presented) The resonant converter of claim 9, further comprising a regulating circuit for deriving from each of the multiple outputs a measuring signal for regulating an output voltage of the inverter.

29. (Previously Presented) The resonant converter of claim 28, further comprising an inverter coupled to an output of the regulating circuit and in response thereto generating a chopped DC voltage signal to be coupled to the primary winding of the transformer.

30. (Previously Presented) The resonant converter of claim 29, wherein the regulating circuit provides a signal to the inverter to set a frequency and a duty cycle of the chopped DC voltage signal.

31. (Previously Presented) A resonant converter, comprising:

multiple outputs; and

a transformer with a primary winding and at least two secondary windings of different winding directions,

wherein the secondary windings of the transformer are connected to the converter outputs by way of one diode and one output filter each, and

wherein the transformer has a first group of secondary windings with one or more secondary windings having a first winding direction and a second group of secondary windings with one or more secondary windings having a second winding direction, at least two of the secondary windings being electrically separated from one another, further comprising a regulating circuit for deriving from each of the multiple outputs a measuring signal for regulating an output voltage of the inverter.

32. (Previously Presented) The resonant converter of claim 31, further comprising an inverter coupled to an output of the regulating circuit and in response thereto generating a chopped DC voltage signal to be coupled to the primary winding of the transformer.

33. (Previously Presented) The resonant converter of claim 32, wherein the regulating circuit provides a signal to the inverter to set a frequency and a duty cycle of the chopped DC voltage signal.

34. (Previously Presented) The resonant converter of claim 5, wherein the inverter comprises:

first and second switching elements arranged in series across an input DC voltage; and

a half-bridge drive circuit adapted to receive a signal from a regulating circuit and in response thereto to provide first and second control signals for switching the first and second switching elements, respectively,

wherein an output of the inverter at a node between the first and second switching elements is connected in series with the capacitive element, the external inductive element, and the primary winding of the transformer.

EVIDENCE APPENDIX

{None}

RELATED PROCEEEDINGS APPENDIX

{None}